Magnetic properties of iron oxide nano-particles fabricated by the inverse micellar method (poster)

Hjøllum, J.í; Kuhn, L.T.; Carpenter, E.E.; Bechgaard, K.; Madsen, M.B.; Johnson, E.; Frandsen, C.; Mørup, S.

Publication date:
2003

Document Version
Publisher's PDF, also known as Version of record

MAGNETIC PROPERTIES OF IRON OXIDE NANO-PARTICLES FABRICATED BY THE INVERSE MICELLAR METHOD

J. í Hjøllum (Center for Planetary Science, Niels Bohr Institute for Astronomy, Physics and Geophysics, University of Copenhagen, Denmark and Materials Research Department, Risø National Laboratory, Denmark), L. Theil Kuhn (Materials Research Department, Risø National Laboratory, Denmark), E. E. Carpenter (Naval Research Laboratory, Washington DC, USA), K. Bechgaard (Polymer Department, Risø National Laboratory, Denmark), M. B. Madsen (Center for Planetary Science, Niels Bohr Institute for Astronomy, Physics and Geophysics. University of Copenhagen, Denmark), E. Johnson (Niels Bohr Institute fAPG, Ørsted Laboratory, University of Copenhagen, Denmark and Materials Research Department, Risø National Laboratory, Denmark), C. Frandsen (Department of Physics, Technical University of Denmark, Denmark) and S. Mørup (Department of Physics, Technical University of Denmark, Denmark)

We have fabricated various types of iron oxide nanoparticles by the inverse micellar method[1,2] and systematically studied their magnetic properties by Mössbauer spectroscopy. The inverse micellar method allows control of the oxidation state and fabrication of monodisperse nanoparticles. We present an analysis of the manufactured iron oxide particles. This investigation reveals details about particle shape, size distribution, and the variation of the Mössbauer hyperfine field as function of temperature; furthermore we are presenting results on the change of magnetic properties as function of the particle size. Particularly, for the smaller particle sizes the magnetic properties show nano-scale related effects, e.g. superparamagnetism.

REFERENCES

1. C. T. Seip et al. IEEE Transactions on Magnetics **34**, 1111 (1998)
2. E. E. Carpenter. Synthesis of magnetic nanoparticles using reverse micelles. Ph.D. Thesis 1999. University of New Orleans (1999)
3. A. Ramdani et al. Pertubation de l'echange electronique rapide par les lacunes cationiques dans $Fe_{3-x}O_4$ ($x \leq 0.09$). J. Phys. Chem. Solids **48**, 217 (1987)